

**UNITED STATES DISTRICT COURT  
SOUTHERN DISTRICT OF NEW YORK**

*In re: Hi-Crush Partners L.P. Securities Litigation*

No. 12-Civ-8557 (CM)

ECF Case

**DECLARATION OF DR. ADAM WERNER APRIL 15, 2014\***

\* Gnarus Advisors, LLC, Berkeley, CA 94710

## TABLE OF CONTENTS

I.	INTRODUCTION .....	1
II.	SUMMARY OF OPINIONS.....	1
	A. Based On Widely Accepted Criteria Used To Determine A Stock's Market Efficiency, Hi-Crush's Common Units Traded In An Efficient Market During The Class Period. ....	1
III.	PROFESSIONAL BACKGROUND AND EXPERIENCE.....	3
IV.	BACKGROUND.....	4
V.	BASIS FOR OPINIONS.....	6
	A. Based on widely accepted criteria used to determine a stock's market efficiency, Hi-Crush's common units were traded in an efficient market during the Class Period. ....	6
	1) Theory.....	6
	2) Factors Considered by Courts for Hi-Crush .....	10
	(a) <i>Cammer Factor 1: Average Weekly Trading Volume</i> .....	10
	(b) <i>Cammer Factor 2: Analyst Coverage</i> .....	12
	(c) <i>Cammer Factor 3: Market Makers</i> .....	14
	(d) <i>Cammer Factor 4: SEC Form S-3 Eligibility</i> .....	15
	(e) <i>Cammer Factor 5: Price Reaction to New Information</i> .....	16
	(i) <i>Reaction to Movements in the Market and Industry</i> .....	19
	(ii) <i>Speed of price reaction to new information</i> .....	20
	(iii) <i>Event Study of News and Non-News Days</i> .....	22
	(iv) <i>Correlation of absolute stock returns with trading volume</i> .....	24
	(v) <i>Conclusion</i> .....	26
	B. Other indicia of market efficiency.....	26
	1) Market Capitalization .....	26
	2) Bid-Ask spread .....	27

3) Statistical test for weak-form market efficiency.....	28
4) Institutional investors' holdings .....	29
5) Short interest.....	30
VI. CONCLUSION .....	31
VII. POTENTIAL ADDITIONAL ANALYSES TO PERFORM.....	32

I, Adam Werner, declare and state, under penalty of perjury, that the following is true and correct to the best of my knowledge, information, and belief. If called to testify, I could and would testify competently to the following facts.

## **I. INTRODUCTION**

1. I, Dr. Adam Werner, have been retained by Kirby McInerney (“Counsel”) on behalf of HITE Hedge LP and HITE MLP LP (collectively the “Plaintiffs”) individually and on behalf of all other similarly situated parties in a securities class action against Hi-Crush Partners L.P. and Hi-Crush GP (collectively “Hi-Crush”), Robert E. Rasmus, James M. Whipkey, Laura C. Fulton, and Jeffries V. Alston, III (collectively the “Defendants”).

2. My opinions address the following matter: whether the market for Hi-Crush’s common units was efficient during the Class Period.<sup>1</sup>

3. I understand that as an expert witness in this proceeding my duty in providing my report is to the Court and that this duty overrides any obligation to the parties who have engaged me, from whom I have received instructions or from whom I have been paid. I confirm that I have complied with this duty.

## **II. SUMMARY OF OPINIONS**

### **A. Based on widely accepted criteria used to determine a stock’s market efficiency, Hi-Crush’s common units traded in an efficient market during the Class Period.**

4. I base my finding of market efficiency for Hi-Crush’s common units on a number of analyses and the analyses’ results for Hi-Crush’s common units including;

- a. The average weekly trading volume of Hi-Crush’s common units as a percentage of common units outstanding was 5.63% which is more than 2.8 times the 2%

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<sup>1</sup> The Class Period is between September 19, 2012 and November 12, 2012.

needed to meet the “strong presumption” benchmark set forth by the court in *Cammer v. Bloom*, 711 F.Supp. 1264 (D.N.J.1989) (“*Cammer*”);

- b. Hi-Crush’s coverage by 8 securities analysts over the Test Period as well as at least 282 news stories, press releases, SEC filings and trade publications over the same period;<sup>2</sup>
- c. The presence of a Dedicated Market Maker that provides liquidity and facilitates trading in Hi-Crush over the Class Period;
- d. Hi-Crush’s ability to meet the requirements to file an S-3 during the Class Period save for any criterion dependent upon the number of days/years it had been a publicly traded company as it had only been a publicly traded company for 89 days as of November 12, 2012, the end of the class period;
- e. The strong correlation between Hi-Crush’s common unit price and the movement in market and industry indices is consistent with informational efficiencies with respect to market and industry supply and demand factors;
- f. The speed at which Hi-Crush’s common unit price reacted to news during the Test Period;
- g. The significant difference in Hi-Crush’s common unit price movements on “news days” compared to “non-news days;”
- h. Hi-Crush’s average market capitalization of \$290 million over the class period;
- i. Hi-Crush’s relatively low average bid-ask spread of .49% during the Class Period;
- j. The presence of short sellers in Hi-Crush’s common units is an indication of arbitrage activity, which is consistent with a well-functioning and efficient market; and
- k. The absence of autocorrelation in Hi-Crush’s returns meaning there were no systematic arbitrage opportunities to profit on trades based on old information.

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<sup>2</sup> Because the Class Period in this case consists of 54 Calendar days and 37 trading days, when addressing any criterion that deals with the transfer of news or information about Hi-Crush or the stock market in general and its impact on Hi-Crush’s stock price, I use a period from September 19, 2012 (the beginning of the Class Period) to November 13, 2013 (a year after the impact of the corrective disclosure on Hi-Crush’s stock price which I define as the Test Period. In addition, note that in the 27 trading days between Hi-Crush’s IPO and the beginning of the class period, Hi-Crush was followed by at least 7 analysts who issued 7 recommendations (see Exhibit 6).

### III. PROFESSIONAL BACKGROUND AND EXPERIENCE

5. I am currently a Director at Gnarus Advisors, LLC (“Gnarus”) located in Berkeley, California. Prior to that, I was the owner of Berkeley Economic Consulting (“BEC”) which was acquired by Gnarus. I have been affiliated with Gnarus/BEC since 2009 and have spent the last 16 years working for consulting firms including Cornerstone Research, CRA International, and NERA. I have been retained by both plaintiffs and defendants to consult on matters pertaining to market efficiency, materiality and loss causation, damages, investment banking, financial valuation, security issuance, bankruptcy, and option backdating. My opinions have been accepted as evidence in Federal, State, and Bankruptcy courts within the United States as well as the Superior Court of Justice for Ontario, Canada and the Supreme Court of Victoria at Melbourne, Australia. I have lectured frequently to attorneys on the topic of damage estimation and settlements in securities class actions. I have also spoken on the estimation of capital rates in emerging economies at a conference organized by the University of Texas’ School of Law.

6. I hold a Ph.D. in Finance (1999) from Northwestern University’s Kellogg Graduate School of Management. While at Kellogg, I taught M.B.A. classes in both corporate finance, and futures and options. I was also awarded a University Scholarship during my time at Kellogg. Prior to graduate school, I served as a Research Assistant at the Federal Reserve Bank of Cleveland. My full Vitae is attached as Exhibit 1 to this declaration.

7. A list of documents I reviewed in forming my opinion in this matter is set forth in Exhibit 2 to this report.

8. I am currently being compensated at \$475 per hour for my ongoing work on this matter. Additional Gnarus consultants have assisted me with my work at rates ranging from \$200 per hour to \$250 per hour.

#### **IV. BACKGROUND**

9. Hi-Crush Partners L.P., or Hi-Crush, is a domestic producer and supplier of monocrystalline sand, which is used as a proppant in hydraulic fracturing. Hi-Crush produces this “frac sand” from several Northern White Sand mining locations in Wisconsin and delivers it to major US shale basins by train.<sup>3</sup> This case arises in response to information Hi-Crush failed to publicly disclose during the third quarter of 2012.<sup>4</sup>

10. Central to Hi-Crush’s business are long-term, take-or-pay contracts that require its customers to pay a specified price for a specified volume of monocrystalline sand each month.<sup>5</sup> In the months leading up to the IPO, Hi-Crush touted its long-term contracts with four pressure pumping service providers. Hi-Crush said the contracts significantly reduced its exposure to short-term fluctuations in the price of and demand for frac sand.<sup>6</sup> The loss of these contracts, or reduced purchasing by any of them, could substantially harm Hi-Crush’s operations results.<sup>7</sup> In the Registration Statement Hi-Crush submitted to the SEC for its August 16, 2012 Initial Public Offering, Hi-Crush said that substantially all of its revenue and gross profit in 2011 and the first quarter of 2012 was generated from long-term contracts. Hi-Crush expected 2012

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3 See [www.hicrushpartners.com](http://www.hicrushpartners.com).

4 Amended Consolidated Class Action Complaint for Violations of the Federal Securities Laws *In re Hi-Crush Partners LP Securities Litigation*, 12-CIV-8557 (CM), February 15, 2013, pp 1-5.

5 See [www.hicrushpartners.com](http://www.hicrushpartners.com).

6 Hi-Crush Partners LP: Form S-1 Registration Statement, July 6, 2012, pp 2-3.

7 Hi-Crush Partners LP: Form S-1 Registration Statement, July 6, 2012, p 1.

contracted revenue to be generated from four customers: Halliburton Company, Weatherford International Ltd., Baker Hughes Incorporated, and FTS International, LLC. Sales to Baker Hughes represented 18.2% of Hi-Crush's expected contracted revenue in 2012.<sup>8</sup>

11. Hi-Crush successfully completed its IPO on August 16, 2012 raising \$290 million in gross proceeds by selling 12,937,500 common units.<sup>9</sup> Then, on September 19, 2012, Baker Hughes notified Hi-Crush that it was terminating its supply contact.<sup>10</sup> According to Baker Hughes, Hi-Crush had breached the confidentiality clause of the supply contract by attaching a version of the contract to its IPO Registration Statement.<sup>11</sup> Hi-Crush, however, did not publicly disclose Baker Hughes' termination until November. In fact, during a presentation at an industry meeting on September 25, 2012, Hi-Crush continued to promote Baker Hughes as an important, long-term buyer of its frac sand.<sup>12</sup>

12. Finally, on November 13, 2012 prior to the market's opening, Hi-Crush disclosed the termination of the supply agreement with Baker Hughes. Hi-Crush said it had, "engaged in discussions with Baker Hughes . . . but the parties were unable to reach a mutually satisfactory resolution." Hi-Crush formally terminated the supply agreement on November 12, 2012 while at the same time it filed suit against Baker Hughes seeking damages over the contract

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8 Hi-Crush Partners LP: Form S-1 Registration Statement, July 6, 2012, p 100.

9 "Hi-Crush Partners IPO Rises After Price Cut: Producer of sand for hydraulic fracturing gains 18%," Marketwatch.com, August 16, 2011.

10 Hi-Crush Partners Press Release, "Hi-Crush Partners LP Reports Third Quarter 2012 Results," Thomson Reuters ONE, November 13, 2012, p 1.

11 *In re Hi-Crush Partners L.P. Sec. Litig.*, No. 12 Civ. 8557 (CM), 2013 WL 6233561, at \*1 (S.D.N.Y. Dec. 2, 2013).

12 Hi-Crush Partners LP, "Energy Prospectus Group Lunch Presentation," September 25, 2012, p 14.

termination.<sup>13</sup> The value of Hi-Crush common units dropped over 26% from \$20.35 on November 12, 2012 to \$15.00 on November 13, 2012 on heavy trading volume (3,372,673 common units, compared to a class period daily average of 149,672 common units).<sup>14</sup> Hi-Crush was subsequently downgraded to “neutral” from “outperform” by at least one equity analyst at Robert Baird.<sup>15</sup>

## V. BASIS FOR OPINIONS

### A. Based on widely accepted criteria used to determine a stock's market efficiency, Hi-Crush's common units were traded in an efficient market during the Class Period.

#### 1) Theory

13. The efficient market hypothesis forms the foundation of modern finance theory. Finance theory holds that the market price of a stock reflects the discounted value of expected future cash flows to the stockholder. As a result, new information that causes the market to significantly alter its expectations of future cash flows will cause a repricing of the security to reflect these new expectations.<sup>16</sup> Therefore, “in competitive markets easy profits don’t last. As investors try to take advantage of the information in past prices, prices adjust immediately until the superior profits from studying past price movements disappear.”<sup>17</sup>

14. It is generally accepted that there are three forms of market efficiency; weak form, semi-strong form and strong form. Under weak form efficiency, a stock's “[price]

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13 Hi-Crush Partners Press Release, “Hi-Crush Partners LP Reports Third Quarter 2012 Results,” Thomson Reuters ONE, November 13, 2012, p 1.

14 Bloomberg Data accessed February 10, 2014.

15 Bloomberg Data, “Hi-Crush Partners LP cut to ‘neutral’ at Robert Baird,” November 13, 2012.

16 See, e.g., Fama, Eugene F., “Efficient Capital Markets: II,” *Journal of Finance* 46, Vol. XLVI, No. 5, December 1991, pp. 1575-1617.

reflect[s] the information contained in the record of past prices.”<sup>18</sup> In other words, one cannot realize abnormal profits by studying past returns because all information related to past returns are already incorporated into a stock’s current price.

15. Under the semi-strong form of efficiency, “prices reflect not just past price but all other public information, for example, from the Internet or financial press.”<sup>19</sup> This form of efficiency is similar to the weak form in so far as stocks incorporate all past price information but they also reflect all current, public information. In this way, as new information about a company is made public, a stock will adjust quickly to that information. Typically when individuals either inside or outside of academia discuss market efficiency, they reference the semi-strong form.

16. When a market is strong form efficient, it means it is semi-strong form efficient with the caveat that stocks reflect private information as well. For example, if a company insider has information about a company which has not yet been made public, said information should, theoretically, be incorporated into a stock’s price. In this type of scenario, no one should be able to earn profits which consistently beat the market because no individual ever has an informational advantage.

17. Once the efficient market hypothesis was established, economists began to look for evidence that markets were in fact efficient.<sup>20</sup> “To analyze the semi-strong form of the efficient-market hypothesis, researchers “measured how rapidly security prices respond[ed] to

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17 Brealey, Richard, Stewart Myers and Franklin Allen, *Principles of Corporate Finance*, Tenth Edition, McGraw-Hill Irwin, 2011, p.317.

18 Brealey, Myers and Allen, p. 317.

19 Brealey, Myers and Allen, p. 317.

different items of news, such as earnings or dividend announcements, news of a takeover, or macroeconomic information.”<sup>21</sup> These studies came to be known as event studies. Event studies have been used for over 30 years in thousands of academic articles that attempt to evaluate how new information affects securities prices.<sup>22</sup> The event study methodology has gone on to form the basis for assessing loss causation and artificial inflation in securities class actions.<sup>23</sup>

18. Other factors beyond an immediate stock price response to new information began to be associated with efficient markets. For example, economists have argued that a stock’s trading volume was correlated with a market’s efficiency such that the more trading volume a stock had, the more efficient its market was. This theory was based on the idea that in order for information to be incorporated quickly into a stock’s price, one must be able to freely buy and sell said stock.<sup>24</sup> Sufficient trading volume enables one to freely buy and sell a stock. By counterexample, assume one learns unexpected information about a company and then finds that there is insufficient volume to trade on said information. In this case, the new information would not be impounded into the stock’s price.

19. Economists also believed that the number of analysts which follow a firm is related to a stock’s market efficiency. This is based on the theory that,

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20 See, e.g., Fama, Eugene, “Efficient Capital Markets: A Review of Theory and Empirical Work,” *Journal of Finance* Vol. 25, No. 2, May 1970, pp. 383-417.

21 Brealey, Myers and Allen, p. 318.

22 See, e.g., Binder, John, “The Event Study Methodology Since 1969,” *Review of Quantitative Finance and Accounting* Vol. 11, 1998, pp. 111-137.

23 See, e.g., Tabak, David I. and Frederick C. Dunbar, “Materiality and Magnitude: Event Studies in the Courtroom,” in *Litigation Services Handbook: The Role of the Financial Expert*, Third Edition, Ed. by Roman L. Weil, Michael J. Wagner and Peter B. Frank, Wiley, 2001, Chapter 19.

24 See, e.g., Barber, Brad, Paul Griffin and Baruch Lev, “The Fraud-on-the-market theory and the indicators of common stocks’ efficiency,” *The Journal of Corporation Law* Winter 1994, p. 291.

analysts gather and independently generate information about companies and disseminate such information to their clients (e.g., in the form of earnings forecasts and recommendations). Accordingly, it can be expected that the larger the number of analysts following a security, the more efficiently it will be traded,<sup>25</sup>

or, the less likely information will not be reflected in a stock's price.<sup>26</sup>

20. The market value of a firm was also thought to be correlated with a stock's market efficiency where stocks with larger market capitalizations were thought to be traded in more efficient markets than those with smaller market capitalizations. This was partially based on "many researchers hav[ing] documented that firm size is an important variable to explain firm behavior and stock returns."<sup>27</sup>

21. A securities bid-ask spread was often associated with its market efficiency as well.<sup>28</sup> This is because in academia, a stock's bid-ask spread is often used as a measure of a stock's liquidity or cost of trading.<sup>29</sup> All things equal, a lower bid-ask spread implies that there is a sufficient number of investors willing to buy or sell a security, thus the cost of executing a trade is lower, all else equal. Lower costs of trading imply that there are fewer impediments for investors to trade on new information.

22. Many of these economic indicators have been adopted by courts in order to aid jurists in determining whether or not the market for a stock is efficient. In fact, the efficient

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25 Barber, Griffin and Lev, p. 292.

26 As will be discussed later, with the rise of the internet and 24 hour business news channels, there are multiple sources of information beyond analyst reports that affect equity prices.

27 See Fama, Eugene and Kenneth French, "The Cross-Section of Expected Stock Returns," *Journal of Finance*, Vol XLVII, No 2, June 1992, pp. 427-465 (discussing how the role of size explains returns).

28 A bid ask spread is the price at which a market maker (intermediary) is willing to buy and sell a stock. For instance, if I am making a market in Company Y's stock, I might be willing to buy (bid) shares of Y's stock at \$10 per share and sell (ask) the same share of stock at \$11.

market hypothesis is one of the few economic theories recognized by the U.S. Supreme Court. This occurred in *Basic, Inc. v. Levinson*.<sup>30</sup> Specifically, the *Basic* decision served to reaffirm the use of event studies in securities class actions, a tool relied upon by damage experts for decades in calculating losses under the efficient market hypothesis.<sup>31</sup>

## 2) Factors Considered by Courts for Hi-Crush

23. The economic theories I discussed previously have been accepted by U.S. courts in their efforts to determine whether or not a stock was traded in an efficient market. For example, the district court in *Cammer v. Bloom* used five factors in determining a stock's market efficiency.<sup>32</sup> The factors considered were (1) a stock's/firm's average weekly trading volume, (2) analyst coverage, (3) number of market makers, (4) eligibility to file an SEC Form S-3, and (5) price reaction to new information.

24. The following sections explain the Court's rationale for choosing these factors and how they are applicable to Hi-Crush during the Class Period in question.

### (a) *Cammer Factor 1: Average Weekly Trading Volume*

25. The first *Cammer* factor is that a stock's "average weekly trading volume ... [would be] in excess of a certain number of shares."<sup>33</sup> The court explained:

The reason the existence of an actively traded market, as evidenced by a large weekly volume of stock trades, suggests there is an efficient market is because it implies significant investor interest...Such interest, in turn, implies a likelihood

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29 See Harris, Larry, *Trading & Exchanges: Market Microstructure for Practitioners*, Oxford University Press, 2003, pp. 69-71.

30 *Basic, Inc. v. Levinson*, 485 U.S. 224 (1988).

31 See, e.g., Cornell, Bradford and R. Gregory Morgan, "Using Finance Theory to Measure Damages in Fraud on the Market Cases," *UCLA Law Review* Vol. 37, No 5, 1990, pp. 883-924.

32 *Cammer v. Bloom*, 711 F. Supp. 1264 (D.N.J. 1989).

33 *Cammer* 711 F. Supp. at 1286.

that many investors are executing trades on the basis of newly available or disseminated corporate information.<sup>34</sup>

26. More specifically, the court stated: “turnover measured by average weekly trading volume of [2%] or more of the outstanding shares would justify a strong presumption that the market for the security is an efficient one; [1%] would justify a substantial presumption.”<sup>35</sup>

27. Throughout the Class Period, there were approximately 13.6 million common units of Hi-Crush outstanding (*see Exhibit 3*). Over that same period, Hi-Crush’s average weekly trading volume ranged from 402,244 common units to approximately 1.32 million common units.<sup>36</sup> Looking at Exhibit 4 one can see that the average weekly trading volume of Hi-Crush’s common units during the Class Period as a percentage of its common units outstanding was 5.63% which greatly exceeds the *Cammer* benchmark of 2% allowing for a “strong presumption” of market efficiency by a factor of 2.8.<sup>37</sup> Thus, one can make a strong presumption of market efficiency for Hi-Crush’s stock during the Class Period under this *Cammer* factor.

28. Another measure of trading volume used in this type of analysis is the annualized turnover ratio, which is the annual reported trading volume divided by the number of shares outstanding. Total trading volume of Hi-Crush’s common units during the Class Period exceeded 5.5 million common units while the average number of common units outstanding during the Class Period was slightly over 13.6 million. This corresponds to an annualized turnover ratio of 754% (*see Exhibit 5*).<sup>38</sup> By comparison, the average annualized turnover ratio

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<sup>34</sup> *Cammer*, 711 F. Supp. at 1286.

<sup>35</sup> *Cammer* 711 F. Supp. at 1286.

<sup>36</sup> Note that this excludes the approximately 3.4 million common units that were traded on November 13, 2012.

<sup>37</sup> This corresponds to 748,360 shares traded per week during the class period.

<sup>38</sup> Annualized Turnover Ratio = Share Volume/(Average Number of Shares Outstanding) X (Length of Class Period in Years).

for all stocks traded on the NYSE in 2012 was 67%.<sup>39</sup> This again is an indicator that the market for Hi-Crush's common units was efficient during the Class Period.

**(b) *Cammer Factor 2: Analyst Coverage***

29. The second factor under *Cammer* is that "it would be persuasive [if] a significant number of securities analysts followed and reported on a company's stock."<sup>40</sup> If investment professionals were closely monitoring a firm's information and subsequently making buy/sell recommendations to their clients based on said information, "the market price of the stock would be bid up or down to reflect the [company's] financial information...as interpreted by the securities analysts."<sup>41</sup> Once again, this barometer was used to suggest that the more analysts which followed a stock, the greater the likelihood that a stock traded in an efficient market.

30. It should be noted that in this day and age, information regarding a publicly-traded security is readily available through multiple sources including the internet, 24 hour business news channels and the media. As such, both individual and institutional investors are able to obtain information about publicly-traded securities and the market in general in ways that were unfathomable when the court reached its decision in *Cammer*. As a result, it is my opinion that while analyst coverage implies there is interest in a company and its securities, significant analyst coverage is not necessary to show that a security is traded in an efficient market.

31. It should also be noted that as the Class Period in this case consists of 54 Calendar days and 37 trading days, when addressing any criterion that deals with the transfer of

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39 NYSE Factbook Online, 2012.

40 *Cammer* 711 F. Supp. at 1286.

41 *Cammer* 711 F. Supp. at 1286.

news or information about Hi-Crush or the stock market in general and its impact on Hi-Crush's common unit price, I use a period from September 19, 2012 (the beginning of the Class Period) to November 13, 2013 (a year after the impact of the corrective disclosure on Hi-Crush's common unit price). I refer to this period as the Test Period.

32. That having been said, during the Test Period there were at least 8 companies/analysts following Hi-Crush that issued recommendations and/or research reports. The firms were Barclays, Credit Suisse, EVA Dimensions, Raymond James, RBC Capital, Robert W. Baird & Co., UBS, and William Blair & Co. (*see Exhibit 6*). The aforementioned firms/analysts released at least 53 reports and recommendations during the Class Period and the following year. This does not include the additional 7 recommendations from 7 analysts that occurred between Hi-Crush's IPO on August 16, 2012 and the beginning of the class period on September 19, 2012.

33. Another measure of information available about a company is the sheer volume of a company's media coverage including company press releases and other news events available to the market.<sup>42</sup> In *Cheney v. CyberGuard*, the court stated: "Plaintiffs have shown that CyberGuard was featured in a significant number of news items indicating that information regarding CyberGuard may have been widely distributed, which would support a finding of efficiency."<sup>43</sup>

34. During the Test Period, over 282 news stories, press releases and SEC filings featuring Hi-Crush appeared in financial publications and newswires, including Bloomberg

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42 See *Cammer*, 711 F. Supp at 1285, citing that the company "issued numerous press releases concerning its business operations..."

43 See *Cheney v. CyberGuard Corp.*, 213 F.R.D. 484 (S.D. Fla. 2003).

News, Market News PR Newswire, Business Wire and Reuters. I have provided a chronology of news stories, press releases and SEC filings in Appendix A.

35. In my view, the number of analyst reports and analysts covering Hi-Crush generally supports a finding of market efficiency. In addition, I find that the wide dissemination of information about Hi-Crush from company press releases and from well-regarded and widely read sources in the news media such as Bloomberg News, Market News PR Newswire, Business Wire and Reuters also supports a finding of market efficiency because information about Hi-Crush, including analyst coverage, was the subject of media coverage and thus available to investors.

**(c) *Cammer Factor 3: Market Makers***

36. The third factor under *Cammer* is that efficiency would be suggested if a stock had a number of market makers.<sup>44</sup> The court stated: “the existence of market makers and arbitrageurs would ensure completion of the market mechanism; these individuals would react swiftly to company news and reported financial results by buying or selling stock and driving it to a changed price level.”<sup>45</sup> Another way of thinking about this is that market makers are used to facilitate market efficiency in over-the-counter markets such as the Nasdaq Global Market.<sup>46</sup>

37. During the Class Period, Hi-Crush was traded on the NYSE Amex, which is primarily an order driven market with a floor based trading system.<sup>47</sup> Historically, a specialist

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<sup>44</sup> This too parallels economic theory with regards to stocks traded in over-the-counter markets. See, for example, Barber, Brad, Paul Griffin and Baruch Lev, “The Fraud-on-the-market theory and the indicators of common stocks’ efficiency,” *The Journal of Corporation Law*, Winter 1994, p. 291.

<sup>45</sup> *Cammer* 711 F. Supp. at 1286.

<sup>46</sup> Note that in *Cammer*, the equity in question was traded over-the-counter.

<sup>47</sup> See Harris, Larry, *Trading & Exchanges: Market Microstructure for Practitioners*, Oxford University Press, 2003, pp. 48, 96.

was assigned to each security to provide liquidity for that security on the NYSE and Amex.<sup>48</sup> In 2008, the NYSE Amex changed the name and role of the specialist to a Designated Market Maker (“DMM”) who performed virtually the same role that multiple market makers perform for a Nasdaq listed stock by providing liquidity and facilitating a security’s market.<sup>49</sup>

38. Because this *Cammer* factor relates to stocks that are traded over-the-counter, the number of market makers is not relevant to an NYSE Amex stock like Hi-Crush for which a DMM provides liquidity. That having been said, the presence of a DMM supports a finding of market efficiency for Hi-Crush over the Class Period.

**(d) *Cammer Factor 4: SEC Form S-3 Eligibility***

39. The fourth factor cited by the *Cammer* court is a firm’s ability to file an S-3 Registration Statement in connection with a public offering. The Securities and Exchange Commission (“SEC”) allows certain companies which have previously provided large amounts of public information in their SEC filings to forego filing this information again when registering to offer securities.<sup>50</sup> Firms that are eligible to file S-3’s must have previously been subject to the Securities Exchange Act of 1934 reporting requirements for more than one year, filed all SEC documents in a timely manner over the previous year, shown that they have not failed to pay dividends or sinking funds nor defaulted on debts or material leases, and have an aggregate market value of common equity of at least \$75 million. Should a firm pass these criteria, the SEC deems there to be sufficient public information regarding the company that it may

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48 See Harris, Larry, *Trading & Exchanges: Market Microstructure for Practitioners*, Oxford University Press, 2003, p. 496.

49 See <http://usequities.nyx.com/listings/dmms> for a more complete description.

50 See [www.sec.gov/about/forms/forms-3.pdf](http://www.sec.gov/about/forms/forms-3.pdf).

incorporate prior SEC filings by reference into current filings rather than repeat publicly accessible information.

40. By the end of the class period, Hi-Crush had been a publicly traded company for 89 calendar days. As a result, the only S-3 criteria that Hi-Crush would have been eligible to meet based on the time it was public was the market capitalization requirement. During the class period, Hi-Crush's average market capitalization was \$290 million, which far exceeds the SEC's requirement that a company's market capitalization be at least \$75 million. This factor suggests that the market for Hi-Crush's stock was efficient during the Class Period. Note that Hi-Crush subsequently filed an S-3 in 2013.<sup>51</sup>

**(e) *Cammer Factor 5: Price Reaction to New Information***

41. The final factor cited in *Cammer* is that "it would be helpful to . . . [have] empirical facts showing a cause and effect relationship between unexpected corporate events or financial releases and an immediate response in the stock price."<sup>52</sup> For example, this new information might come in the form of an earnings report, dividend change, stock split, regulatory ruling, company press releases, and analyst reports.

42. In an event study, one compares the daily percentage returns in the market price of a company's stock to the returns predicted by a "market model." A market model describes the relationship between the return of a company's stock price and the return on a market index, such as the Standard and Poor's 500 ("S&P 500") composite index and/or an index of comparable companies. Thus, a market model measures the expected return on a stock for a particular day controlling for the overall market and/or an industry specific information available

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51 See <http://www.sec.gov/Archives/edgar/data/1549848/000119312513385517/d601840ds3.htm>.

on that day. The difference between the actual return on an individual stock and the return predicted by the market model is called an “abnormal return” and it measures the impact of new, firm-specific information on a firm’s stock price.

43. Prior to performing an event study, one often decides on an event window over which to measure the relationship between the stock at issue and the corresponding market and industry indices. Once this window is determined one typically undertakes a regression analysis which is a statistical technique for estimating the relationships among variables. A regression analysis will produce a “constant” term, also referred to as an “intercept” term, and one or more slope coefficients called “betas.” In general, the constant term is very close to zero. The betas quantify the sensitivity of a stock’s return to the return on the market and industry indexes. A stock with a market Beta of 1.0 is expected to increase (decrease) by one percent for each one percent increase (decrease) in the market index. Similarly, a stock with a market beta of 2.0 is expected to increase (decrease) by two percent for each one percent increase (decrease) in the market index.

44. In performing my event study I regressed the daily returns of Hi-Crush common units from November 14, 2012 through November 13, 2013 on the S&P 500 composite index as well as an industry index (the Dow Jones U.S. Mining Index) (see Exhibit 7 for regression results).<sup>53</sup> Once the regression was calculated, I used it to calculate Hi-Crush’s expected return for each day during the Test Period. I then subtracted Hi-Crush’s expected return

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52 *Cammer*, 711 F. Supp. at 1287.

53 In estimating the impact of the industry index, I measured it “net-of-market” to minimize the effects of multicollinearity, in which two or more independent variables in a multiple regression model are highly correlated.

from its actual return in order to estimate its abnormal return on a daily basis during the Test Period (see Appendix A).

45. A key statistic from my regression analysis used in determining whether or not Hi-Crush's stock has a significant price change in response to new information is the regression's standard deviation. The standard deviation measures the degree of imprecision in the model's predictions. I use the regression's standard deviation to calculate my abnormal return's "t-statistic." A "t-statistic" measures the number of standard deviations between an actual observation and the prediction. In this case, it is used to determine how many standard deviations the abnormal return is from zero as a result of the new information in Hi-Crush's common units.

46. Based on probability theory, one would randomly observe an abnormal return of 1.96 standard deviations from zero 5% of the time. Put another way, we have a 95% confidence that the actual abnormal return is not statistically significantly different from zero, unless there is some non-random explanation. For our purposes, this non-random explanation would be the incorporation of new information into Hi-Crush's stock price.

47. Not every item of news will result in a large abnormal stock return. To the extent that an analyst report, company disclosure or news report only repeats news that was fully known to the market, no price reaction in a security would be expected. An analyst report, company disclosure or news story should result in a statistically significant return only if the "news" is new and unexpected. Therefore one can test the fifth *Cammer* factor as to whether or not a stock responds to new, material information by analyzing the new information that accompanies significant stock returns.

48. While *Cammer* does not provide specific tests, indicia or factors on which the court relied upon in determining the existence of a cause and effect relationship for a stock and its incorporation of information, economists have been performing various tests utilizing statistical methodologies that can provide probative academic evidence concerning the existence of a cause and effect relationship consistent with market efficiency. What follows is a series of empirical tests for Hi-Crush's common stock that provides evidence concerning the cause-and-effect relationship relevant to determining market efficiency. Each of these tests is based on my two-factor model described above.

**(i) *Reaction to Movements in the Market and Industry***

49. The market model I describe above produces beta coefficients that quantify the sensitivity of Hi-Crush's stock return to the returns on the market and industry index. The coefficient on the market index (S&P 500) was .734 with a t-stat of 3.75, which is statistically significant at the 99% confidence level. This implies that a 1% increase (decrease) in the market index should result in a .73% increase (decrease) in Hi-Crush's stock price. The coefficient on my net-of-market beta is .134 with a t-stat of 1.67 which is statistically significant at a 90% confidence level. This implies that, holding the market index constant, a 1% increase (decrease) in the industry index corresponds to a .134% increase (decrease) in Hi-Crush's stock price. Thus, Hi-Crush's common stock returns are highly sensitive to movements in the market index and fairly sensitive (at a 90% confidence level) to the net-of-market industry index over the event window. This directly supports the hypothesis that Hi-Crush's trading market is informationally efficient with respect to market specific supply and demand factors that naturally affect the market value of Hi-Crush over the estimation period. At the same time, the coefficient on the

industry index also shows that Hi-Crush's stock is responsive to industry-specific supply and demand factors that affect Hi-Crush's market value.<sup>54</sup>

**(ii) *Speed of price reaction to new information***

50. One of the basic hallmarks of market efficiency is the quick incorporation of the effects of new information in stock prices through trading activity in the market. According to Professor Eugene Fama:

The typical result in event studies on daily data is that, on average, stock prices seem to adjust within a day to event announcements. The result is so common that this work now devotes little space to market efficiency. The fact that quick adjustment is consistent with efficiency is noted, and then the studies move on to other issues. In short, in the only empirical work where the joint hypothesis problem is relatively unimportant, the evidence typically says that, with respect to firm-specific events, the adjustment of stock prices to new information is efficient.<sup>55</sup>

51. To test this phenomenon for Hi-Crush's stock price over the Test Period, I use an event study that is not confined to any single kind of new information, but which considers as an event any information that results in an unusually large one-day change in the market value for Hi-Crush's stock. I first assume that these unusually large stock returns generally reflect the reaction by investors to value-relevant new information being disseminated into the market place in agreement with academic studies. It is well known that large stock-price returns and news

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<sup>54</sup> In univariate regression results where Hi-Crush's daily returns are regressed on the returns of the Dow Jones Mining Index for the year after the class period, the t-statistic on the industry index coefficient was 2.95 which is statistically significant at a 99% confidence interval. This directly supports the hypothesis that Hi-Crush's trading market is informationally efficient with respect to industry specific supply and demand factors that naturally affect the market value of Hi-Crush over the estimation period (see Exhibit 8).

<sup>55</sup> Fama, Eugene, "Efficient Capital Markets: II," *Journal of Finance* 46, December 1991, pp. 1601-1602.

events are highly correlated, so I assume for Hi-Crush that the large return days are also “big-news” days.<sup>56</sup>

52. I then directly test for the speed of reaction to news by checking whether or not the material new information that I presume causes the unusually large excess returns are incorporated into Hi-Crush’s stock price within one or more trading days of each of the big-return days.

53. I begin by examining all trading days over the Test Period in which the absolute value of the abnormal return’s t-statistic is at least 2.58, indicating a 99% confidence level for daily statistical significance. This test is independent of any specific event or news that resulted in these large return days. Rather, it requires a sample of days in which the market was likely reacting to unusually material, value-related news. I then check to see how long it takes for Hi-Crush’s common stock to fully adjust to the information on these pre-selected big-news days.

54. I first identified 7 trading days during the Test Period for Hi-Crush with excess returns that were significant at the 99% confidence level (large return days denoted as day (T)). I then examined the abnormal returns for the day after each of the 7 large return days and found that in 6 of the 7 cases, Hi-Crush’s common stock did not experience a statistically significant stock-price movement at the 95% confidence level on the subsequent day. On the one day after day T where there was a statistically significant price reaction, there was also new news on that day. In other words, there were no instances in which one of the 7-large return days was

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<sup>56</sup> Fama, Eugene, “Efficient Capital Markets: II,” *Journal of Finance* 46, December 1991, pp. 1575-1617, and Fama, Eugene, Lawrence Fisher, Michael Jensen and Richard Roll, “The Adjustment of Stock Prices to New Information,” *International Economic Review* 10, February 1969, pp. 1-21.

followed by a statistically significant return on day T+1 for which there was no news on day T+1 (*see Exhibit 9*). To the extent that there was information released on these large abnormal return days, said information was incorporated quickly into Hi-Crush's stock price.

*(iii) Event Study of News and Non-News Days*

55. One test that has commonly been employed by both plaintiff and defense experts in securities litigation to test for a cause-and-effect relationship between news and a stock's response to said news is a statistical comparison of the average stock-price movements for days in the class period on which important firm-specific news was released versus days on which no corresponding firm-specific news was released.<sup>57</sup> This methodology has also frequently been accepted by courts when determining market efficiency.<sup>58</sup>

56. The main step in this analysis is to define what "news" is. In doing so, one should come up with a specific and objective definition for news where, *ex ante*, one would expect a stock price reaction to said news. For the purposes of this analysis, I examine all days in which Hi-Crush issued press releases.<sup>59</sup>

57. Once one has defined what news is, one can then perform a statistical analysis that compares the stock-price reaction on days with "news" to days without "news." Ferrillo,

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<sup>57</sup> See Furrillo, Paul, Frederick Dunbar, and David Tabak, "The 'Less Than' Efficient Capital Market Hypothesis: Requiring More Proof From Plaintiffs in Fraud-On-The Market Cases," *St. John's Law Review* 78(81), Winter 2004, pp. 119-122. See also Tabak, David, "Use and Misuse of Event Studies to Examine Market Efficiency," NERA White Paper, April 30, 2010.

<sup>58</sup> See *In Re Polymedica Corporation Securities Litigation*, 453 F. Supp. 2d 260 (D. Mass 2006) at 269; *In re Alston SA Securities Litigation*, 253 F.R.D. 266 (S.D.N.Y. 2008), at 279; *Vinh Nguyen v. Radient Pharmaceuticals Corporation et al.*, F.R.D. 563 (S.D.C.A. 2012), at 30; and *Christel Billhofer, et al. v. Flamel Technologies, S.A., et al.*, 281 F.R.D. 150 (S.D.N.Y. 2012) at 163.

59 The source for press releases is Hi-Crush's website. Source for time stamps of the press releases comes from Bloomberg.

Dunbar and Tabak succinctly describe this final step in their article published in 2004 in the St. John's Law Review. The authors explain how one should,

...Compar[e] the percentage of days with news that have a statistically significant price movement to days without news that have a statistically significant price movement. For example, if seven percent of the days with news have statistically significant price movements and four percent of the days without news have statistically significant price movements, then the analyst would test whether the difference between the seven percent and the four percent is statistically significant. **If it is, then the evidence would show that, on average, the defendant's stock price reacts to news announcements;** if the difference is not statistically significant, then there would be no basis for saying that the defendant's stock price is affected by news.<sup>60</sup>

58. For my first test, I compare the proportion of statistically significant stock price reactions on "news days" to the proportion on "non-news days." If Hi-Crush's stock price reacts to news during the Test Period, I would expect that the proportion of statistically significant stock-price reactions on "news days" would be greater than the proportion of statistically significant price reaction on "non-news days." This would provide evidence that Hi-Crush's stock price reacted to news during the Test Period. It should be noted, as I stated before, that not all news is expected to cause a statistically significant stock price reaction.

59. During the test period, there were 29 days in which Hi-Crush issued press releases. Of these 29 "news days," 4 days (13.8%) were accompanied by statistically significant price reactions while only 10 of the 261 "non-news days" (3.83%) resulted in statistically significant stock price movements at the 95% confidence interval (See Exhibit 10). Thus, Hi-Crush's stock price was 3.6 times (13.8% / 3.83%) more likely to react in a statistically significant manner on days when the company issued press releases than on "non-news days."

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<sup>60</sup> Ferrillo, Paul, Frederick Dunbar, and David Tabak, "The 'less than' Efficient Capital Markets Hypothesis: Requiring More Proof From Plaintiffs in Fraud-On-The-Market Cases," *St. John's Law Review* 78 (81), Winter 2004, pp. 120-121. (emphasis added).

With a z-stat of 2.37 and a p-value of .018, this difference in proportions is statistically significant at a 98% confidence interval.

60. The second test I perform using this methodology is to compare the average of the absolute values of abnormal returns on days with press releases to the average on days without such releases. The average of the absolute values of abnormal return on the 29 “news days” was 3.11% during the Test Period compared to 1.54% on the 261 “non-news days (*see* Exhibit 11). The t-statistic on the difference in averages of the samples is 1.73 meaning that the difference is statistically significant at the 90% confidence interval. Taken together, these two event-study analyses strongly support the findings that Hi-Crush’s common units traded in an informationally efficient market during the Test Period.

**(iv) *Correlation of absolute stock returns with trading volume***

61. The next test for a cause and effect relationship between information and stock returns consistent with market efficiency is performed by regressing Hi-Crush’s daily absolute stock-price returns (meaning the absolute value of the daily returns) on daily trading volume over the Test Period. Economists have studied the empirical correlation between absolute stock returns and volume since 1970.<sup>61</sup> A strong, direct relationship is the usual finding, and this evidence is generally interpreted as evidence that both volume and stock-price changes have common ties to the flow of new information about a security. The stock-price adjustments

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61 For a survey of this literature, see Karpoff, Jonathan, “The Relation between Price Changes and Trading Volume: A Survey,” *Journal of Financial and Quantitative Analysis* 22, March 1987, pp. 109-126. See also, Epps, Thomas and Mary Lee Epps, “The Stochastic Dependence of Security Price Change and Transaction Volumes; Implications for the Mixture-of-Distributions Hypothesis,” *Econometrica* 44 (2), March 1976, pp. 305–321.

reflect the overall average change in prices to important new information, while the volume reflects changes in expectations of individual traders.<sup>62</sup>

62. By definition, important new information often results in unusually large stock-price changes. Such information typically causes greater-than-normal differences among individual investors' expectations about a firm's exact value based on the important new information. These differences in expectations among investors often manifest themselves by higher than normal trading volume. I check for such a statistical relationship between volume and returns, using both Hi-Crush's absolute stock returns and absolute excess stock returns. These returns are then separately regressed on (the natural log of) Hi-Crush's daily trading volume over the Test Period (see Exhibits 12 and 13).

63. My results suggest a robust, positive relationship between Hi-Crush's daily volume and the absolute value of Hi-Crush's stock-price returns. The t-statistic when regressing daily returns on volume is 10.83 while the corresponding t-statistic is 10.72 when the model is estimated using abnormal returns. Both of these numbers indicate that the two, estimated coefficients are positive at a 99% confidence level meaning that large price movement days are normally accompanied by heavy trading volume suggesting information based trading. This is again indicative of a stock that is traded in an efficient market.

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62 See Ryan, Paul and Richard Taffler, "Are Economically Significant Stock Returns and Trading Volumes Driven by Firm-Specific News Releases?" *Journal of Business Finance & Accounting* 31, January/March, 2004, p.5 0. Another study focused on stock price movements as a "sufficient statistic for information events." See Conrad, Jennifer, Bradford Cornell, Wayne Landsman and Brian Rooftree, "How Do Analyst Recommendations Respond to Major News?" *Journal of Financial and Quantitative Analysis* 41, March 2006, p.31.

**(v) Conclusion**

64. Based on the results of my tests which examined how Hi-Crush's common units reacted to new information, it is clear that based on this criterion, Hi-Crush's common units were traded in an efficient market.

**B. Other indicia of market efficiency**

65. Based on the *Cammer* factors examined above, I believe it is clear that the market for Hi-Crush's common units during the Class Period was an efficient one. Below is a discussion of additional non-*Cammer* factors that academics often examine in an attempt to determine whether or not a stock is traded in an efficient market.

**1) Market Capitalization**

66. The market value of a firm has historically been thought to be correlated with a stock's market efficiency where stocks with larger market capitalizations were thought to be traded in more efficient markets than those with smaller market capitalizations. This was partially based on "many researchers hav[ing] documented that firm size is an important variable to explain firm behavior and stock returns."<sup>63</sup>

67. The court in *Krogman* held that "[m]arket capitalization, calculated as the number of shares multiplied by the prevailing share price, may be an indicator of market efficiency because there is a greater incentive for stock purchasers to invest in more highly capitalized corporations."<sup>64</sup> In addition, some investors such as pension funds are often restricted to owning stocks whose market capitalization is sufficiently high.

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63 See Fama, Eugene and Kenneth French, "The Cross-Section of Expected Stock Returns," *Journal of Finance*, Vol XLVII, No 2, June 1992 (discussing how the role of size explains returns).

64 *Krogman v. Sterritt*, 202 F.R.D at 467, 478 (N.D. Tex. 2001) (emphasis added).

68. During the Class Period, Hi-Crush's average market capitalization was \$290 million (*see Exhibit 3*) with a range in value from \$275 million to \$310 million. In my opinion, Hi-Crush's average market capitalization is sufficient to be a positive indicator of market efficiency over the Class Period.

## 2) Bid-Ask spread

69. While not a factor under *Cammer*, a stock's bid-ask spread is an often-used measure of liquidity or trading costs.<sup>65</sup> A low bid-ask spread implies that there is a sufficient number of investors willing to buy or sell a security, thus the cost of executing a trade is lower, all else equal. Courts have used excessive bid-ask spreads as an indication of a less efficient market because large spreads can make transactions in a security prohibitively expensive. For example in *Krogman v. Sterritt*, the court found that a bid-ask spread "... of 5.6% was extremely high, suggesting market inefficiency."<sup>66</sup> By contrast in *CyberGuard*, the court found that a bid-ask spread of 2.44% "... weighs in favor of market efficiency."<sup>67</sup>

70. By comparison, the average bid-ask spread for Hi-Crush's common stock during the Class Period was 0.49% (*see Exhibit 3*) with the spread ranging from .21% to .92%. Thus Hi-Crush's average bid-ask spread during the Class Period was approximately 1/5 of the threshold bid-ask spread of 2.44% found in *CyberGuard* to weigh in favor of market efficiency. An average bid-ask spread of 0.49% would not be a significant deterrent to arbitrage activity in Hi-Crush's common units and supports the conclusion that Hi-Crush's common units traded in an informationally efficient market during the Class Period.

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<sup>65</sup> See Harris, Larry, *Trading & Exchanges: Market Microstructure for Practitioners*, Oxford University Press, 2003, pp69-71.

<sup>66</sup> *Krogman v. Sterritt*, 202 F.R.D. at 474.

### 3) Statistical test for weak-form market efficiency

71. I also conducted statistical tests to determine whether the returns for Hi-Crush's common units exhibited autocorrelation, which is also referred to as "serial correlation."<sup>68</sup> Autocorrelation in a stock's returns means that tomorrow's stock price movement can be predicted with a degree of statistical confidence based solely on the stock's price movement today. Weak form market efficiency requires that all public information, including today's stock returns, be impounded in tomorrow's stock price so that there are no such arbitrage opportunities available.<sup>69</sup>

72. The presence of autocorrelation implies that an investor might have an unexploited arbitrage opportunity. For example, negative autocorrelation means that if the stock price goes up today, it will more than likely go down tomorrow. The ability to successfully predict the movement in a stock price tomorrow based on what it did today would allow knowledgeable investors to earn abnormal returns, absent transaction costs, based on this pattern. If the arbitrage opportunity is statistically significant, but not profitable due to things like transaction costs, the serial correlation would not be economically significant. Economists have long used the first-order autocorrelation of a stock's returns to check for potential market inefficiency.<sup>70</sup>

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67 See *Cheney v. CyberGuard*, 213 F.R.D. at 501.

68 Autocorrelation has been widely studied in the academic finance literature. For example, see Fama, Eugene, "Efficient Capital Markets: II," *Journal of Finance* 46, December 1991, pp. 1575-1617

69 Weak form tests of the efficient market hypothesis are tests of whether information contained in historic prices is fully reflected in current prices, thus an analysis of autocorrelation is a test of weak form market efficiency. Weak form efficiency is a necessary condition for semi-strong form efficiency because semi-strong efficiency encompasses all public information including past prices,

70 See, e.g., Fama, Eugene, "Efficient Capital Markets: II," *Journal of Finance* 46, December 1991, pp. 1575-1617,

73. To test for autocorrelation, I first performed a regression analysis over the Class Period of Hi-Crush's daily common unit returns on the common unit's return from the previous day. I then performed the same experiment using abnormal returns. I found no statistically significant autocorrelation for Hi-Crush's raw returns or its excess returns (*see* Exhibit 14). These tests for autocorrelation are consistent with a random walk and market efficiency, and support my opinion that Hi-Crush's common units returns during the Class Period did not violate market efficiency.<sup>71</sup>

#### **4) Institutional investors' holdings**

74. Another indication of market efficiency is the presence of institutional investors, arbitrageurs and other professional full-time investors in the market. "Institutional Investors (e.g. mutual funds, money managers, banks) are presumed to be better informed about the securities they hold and better able to interpret new information than individual investors."<sup>72</sup> If, based on their information, a stock's price is too low, these individuals can profit by purchasing the security until it increases in value. Conversely, if the price is too high, the arbitrageur can sell its holdings, or perhaps even "short" the stock (*i.e.*, sell a stock that the arbitrageur does not own) and profit once the stock price declines.

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71 "The term 'random walk' is usually used loosely in the finance literature to characterize a price series where all subsequent price changes are independent from previous prices. Thus, changes in prices will be unrelated to past price changes." See, for example, Fama, Eugene, "Efficient Capital Markets: A Review of Theory and Empirical Work," *Journal of Finance* Vol. 25, No. 2, May 1970, pp. 383-417.

72 Barber, Griffin and Lev, p. 292. For discussion of the role of institutional investors in incorporating information into equity prices, also see, Piotroski, Joseph and Darren Roulstone, "The Influence of Analysts, Institutional Investors, and Insiders on the Incorporation of Market, Industry, and Firm-Specific Information into Stock Prices," *The Accounting Review*, Vol. 79, No. 4, 2004, pp. 1119-1151.

75. In general, institutional investors have significant experience appraising investments and evaluating the impact of new information on a company's future prospects. Academic studies have found that institutional holdings can be a proxy for market efficiency.<sup>73</sup>

76. During the Class Period, institutional investors held between 2.1 million and 4.4 million common units which correspond to between 15.4% and 32.6% of Hi-Crush's outstanding common units with average institutional holdings of 20.3% (*see Exhibit 15*). This level of ownership of Hi-Crush's common stock by institutional shareholders provides no additional support to my opinion that the market for Hi-Crush was informationally efficient during the class period. However in my opinion, there is enough of a meaningful presence by sophisticated professional investors to prevent this evidence from implying market inefficiency.

### **5) Short interest**

77. The amount of arbitrageurs, who would attempt to profit from trading mispriced securities, is important for an efficient market. If the price of a security is too low, these "arbitrageurs" can profit simply by purchasing the security and holding it until it appreciates. If the price is too high, however, the arbitrageur might attempt to "short" the stock.

78. The amount of short interest for Hi-Crush's common stock during the Class Period was between .47% and 1.53% of Hi-Crush's outstanding common units, with an average of 1.07% (*see Exhibit 3*). By comparison, the average short interest for NYSE stocks during the Class Period was 3.1%. The presence of short sellers in Hi-Crush's common stock is an indication of arbitrage activity, which is consistent with a well-functioning and efficient market. Moreover, the level of short interest in relation to common units outstanding provides no

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<sup>73</sup> *See Barber, Griffin and Lev, p. 302.* This finding holds for the authors' univariate analysis.

indication of any constraint on short selling activities during the Class Period, such as the inability to locate or borrow the necessary common units to initiate a short position.

79. In order to analyze an investor's ability to cover a short position, I also examined the short interest ratio which measures how many days it would take to cover a short position.<sup>74</sup> The average short interest ratio for Hi-Crush over the class period averaged .80 days which ranged from .28 days to 1.34 days. By comparison, the average short interest ratio for the NYSE over the same period was 3.82 days. This means that on average, during the Class Period, it would take less than one trading day for short sellers to cover their entire short position in Hi-Crush assuming that historical trading volume remained constant.

## VI. CONCLUSION

80. Based on my analyses including an examination of the *Cammer* factors as well as other indicia, it is my opinion that Hi-Crush's common units traded in an efficient market with regard to publicly disclosed information during the Class Period. I base my opinion on the findings from a number of analyses of Hi-Crush's common stock including:

- a. The average weekly trading volume of Hi-Crush's common units as a percentage of common units outstanding was 5.63% which is more than 2.8 times than the 2% needed to meet the "strong presumption" benchmark under *Cammer*;
- b. Hi-Crush's coverage by 8 securities analysts over the Test Period as well at least 282 news stories, press releases, SEC filings and trade publications over the same period;
- c. The presence of a Dedicated Market Maker that provides liquidity and facilitates trading in Hi-Crush over the Class Period;
- d. Hi-Crush's ability to meet the requirements to file an S-3 during the Class Period save for any criterion dependent upon the number of days/years it had been a

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<sup>74</sup> The short interest ratio equals short interest divided by an average daily trading volume. For this analysis, I used a rolling average trading volume for 20 trading days.

publicly traded company as it had only been a publicly traded company for 89 days as of November 12, 2012, the end of the class period;

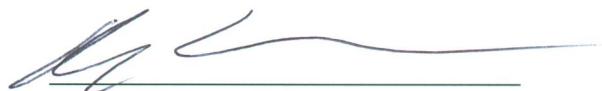
- e. The strong correlation between Hi-Crush's common unit price and the movement in market and industry indices is consistent with informational efficiencies with respect to market and industry supply and demand factors;
- f. The speed at which Hi-Crush's common unit price reacted to news during the Test Period;
- g. The significant difference in Hi-Crush's common unit price movements on "new days" compared to "non-news days;"
- h. Hi-Crush's average market capitalization of \$290 million over the class period
- i. Hi-Crush's relatively low average bid-ask spread of .49% during the Class Period;
- j. The presence of short sellers in Hi-Crush's common units is an indication of arbitrage activity, which is consistent with a well-functioning and efficient market; and
- k. The absence of autocorrelation in Hi-Crush's returns meaning there were no systematic arbitrage opportunities to profit on trades based on old information.

## **VII. POTENTIAL ADDITIONAL ANALYSES TO PERFORM**

81. My opinions are based on the information received as of the date of my report.

Should any additional data surface subsequent to the submission of my report, I reserve the right to make changes to my report based on this new data.

Dated: April 15, 2014



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 Adam Werner, PhD  
 Director, Gnarus Advisors, LLC